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ABSTRACT

Recent reports of high levels of achievement on the Regents examinations in New York state and relatively poor showing on the eighth grade examinations have led many to speculate that the eighth grade examinations lack good predictive properties with respect to the Regents examinations. There are many problems with arriving at such a conclusion, including the unavailability of data that track individual students across these two levels of examination and the confounding includence of intervening variables even if these individual data were available. This study used district-level data from two sources: a sample of 306 districts that administered the June 2000 Regents Comprehensive Examination in English (CEE) and a special administration of the CEE in April 2000 to seniors who had not yet passed the REgents and who missed the January administration because of snow. The limitations of these data call for caution about their interpretation. These district-level data were matched with the spring 2000 performance at the district level on the grade 8 English language arts and grade 4 English language arts examinations. Results show a good predictive relationship among the scores on these examinations. The results of the English language arts examinations are grouped into performance levels from 1 (low) to 4 (high). Particularly strong was the relationship between the representation of the students in level 1 and subsequent performance of the students' districts on the Regents CEE.An appendix presents data on agreement error. (SLD)

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Predictive Sources of Evidence of Construct Validity of the New York State English Language Arts Examinations, Spring 2000 Administrations

Gerald E. DeMauro,
Office of State Assessment
Revised edition, June 2002

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Executive Summary

The New York State Learning Standards are organized into grade blocks: k – 4, 5 – 8, and 9 – 12. The examinations associated with the standards come at the end of these blocks. Each examination is designed to certify the level of achievement of the Learning Standards, and it follows that two secondary functions are served by the examination results:

1. School, district, and State accountability;
2. Evaluation of preparedness to achieve at the next higher level.

Recent reports of high levels of achievement on the Regents examinations and relatively poor showing on the eighth grade examinations have led many to speculate that the eighth grade examinations lack good predictive properties with respect to the Regents examinations. There are many problems with arriving at such a conclusion, including the unavailability of data that tracks individual students across these two levels of examination, and the confounding influence of intervening variables even if these individual data were available.

Nevertheless, a study is presented using district level data from two sources: a Sample of 306 districts that administered the June 2000 Regents Comprehensive Examination in English (CEE), and a special administration of the Regents CEE in April 2000 to seniors who had not yet passed the Regents and who missed the January 2000 administration because of snow. The limitations of these data recommend cautions discussed in great detail below about their interpretation. These district level data were matched with the spring 2000 performance at the district level on the Grade Eight English Language Arts (ELA-8) and Grade Four English Language Arts (ELA-4) examinations.

Results showed a good predictive relationship among the scores on these examinations. The results of the ELA-4 and ELA-8 are grouped into performance levels from 1 (low) to 4 (high). Particularly strong was the relationship between the representation of the students in level 1 and subsequent performance of the students' districts on the Regents CEE.

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Predictive Sources of Evidence of

Construct Validity of the

New York State English

Language Arts Examinations,

Spring 2000 Administrations

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Purpose

This study evaluates the relationship among performance on three State examinations of English Language Arts: the Grade Four, Grade Eight, and Commencement Level examinations. It is designed to further document construct validity of these examinations through predictive sources of evidence.

Validity Focus: Sources of Evidence

In promulgating the New York State Learning Standards in 1995, the State undertook the associated responsibility of accountability at the student, school, district, and State levels. This responsibility has, as its keystone, development and implementation of a new generation of assessments that are sensitive to success and growth in the acquisition of the knowledge and skills specified in the Learning Standards and their derivative performance indicators.

The primary property for these instruments to succeed in this responsibility is construct validity[1]. This validity is manifest in a wide variety of evidence, including sensitivity to growth across populations[2] and evidence of appropriate convergent and

discriminant properties[3]. Predictive evidence can be used to support construct validity by documenting that performance on one level, in a prerequisite test, is related to performance on tests in the same subject area at more advanced grades. We would expect, for example, that results of the Grade Four English Language Arts (ELA-4) examination and the Grade Eight English Language Arts (ELA-8) examination evidence substantial correlations with the Regents Comprehensive Examination in English (CEE), a graduation requirement, and that the ELA-8 results are better related to the ELA-4 results and to the CEE results than are the ELA-4 results to the CEE results simply because the ELA-4 is designed to test prerequisites of ELA-8 and ELA-8 is designed to test prerequisites of the CEE more directly.

Predictive Support of Construct Validity

The nature of testing in New York State has shifted from documenting achievement of coursework to achievement of the Learning Standards. In the former environment, demonstrating achievement on the Regents examinations certified achievement in courses and general preparedness for graduation. In the current environment of Learning Standards, achievement on the new Regents examinations, which are not necessarily course bound, certifies eligibility for graduation and documents acquisition of the required standards and performance indicators. While the differences may seem subtle, they have enormous implications for the types of evidence and the sources of that evidence in support of the validity of the State assessments.

Before adoption of the Learning Standards, a New York State diploma assured that the student had completed the coursework necessary. Inferences about preparedness for college or employment were implicit, and depended first on evaluation of the content

of the test, and then on inferences about how that content was related to the required activities of employment or college work. Since implementation of the Learning Standards, the assessments certify that the student has acquired the knowledge and skills specified by the learning standards. Very simply, what was an implicit domain has become an explicit domain that is given operational definition by the Learning Standards and the derivative performance indicators adopted by the Board of Regents.

While predictive evidence, before, was an important documentation that the Regents examinations were sensitive to the skills utilized after graduation, predictive evidence, now, is only important insofar as the criterion measures require application of the skills and knowledge specified by the Learning Standards. More broadly, the sources of evidence most directly related to validity in the new assessment environment are those that support that the domain tested is the construct defined by the Learning Standards.

The purpose of state testing is accountability. This means that the tests must certify whether or not the Learning Standards have been acquired. They then enable an evaluation of the State, the districts, and the schools, each in their respective roles of providing the standards. Sensitivity of the Regents examinations to the Learning Standards enables them to certify whether or not the students have acquired this well-defined domain of skills and knowledge. Predictive evidence, then, becomes one source for documenting this sensitivity and for documenting construct validity of the tests for this certifying function, and it is not the *sine qua non* of validity, as it is for instruments designed to tell employers or admission officers of more general readiness to learn or perform.

To illustrate, we would expect that an aptitude instrument that is designed to demonstrate preparedness for college, should have a predictive relationship for general

performance in the first year of college. On the other hand, with the State Regents examinations, the relationships should be well-specified to document validity. Thus, the mathematics Learning Standards and performance indicators should first be demonstrated as prerequisite to specific courses in colleges, or specific activities of employment after high school. Then the relationship of performance on these job activities or in these courses to performance on the Regents Mathematics A examination becomes important support for the validity of the Mathematics A test.

Fourth and Eighth Grade Examinations

Keeping these distinctions in mind, sources of validity evidence of the grade four and grade eight instruments can be predictive in nature because, these instruments, as well, are designed to certify acquisition of the appropriate Learning Standards for the respective grade levels. Without contamination from other variables, performance on each of these instruments should be a gauge of performance on the next level of the State test in that subject matter. This is because: (1) the tests are each measures of acquisition of the Learning Standards, (2) the Learning Standards for each block of grades are prerequisite for achievement of the appropriate standards for the next block of grades, and (3) the tests for the next block of grades should be sensitive to achievement of the respective Learning Standards.

Limitations on Estimating Relationships

There are several major obstacles to estimating the relationships among these instruments. The first is that New York State does not have an individual student data tracking system. Although individual performances are available on the ELA-4, ELA-8,

Math-4, and Math-8, they are not routinely available for any of the Regents examinations. Rather, available data consist of:

1. Field test and pretest data;

2. Survey data estimating proportions of a cohort achieving highest scale scores of 0 – 54, 55-64, 65-84, and 85-100 over the course of three administrations of the Regents examinations per year;

3. Individual student data generated by the special administration of the CEE in April 2000 to seniors who had not yet passed the examination. The centralized scoring of this administration made these data available, but the restriction of range limited their utility;

4. A sample of several hundred papers drawn from June administrations to audit results (Department Review).

Even though these sources provide some access to student level data, such individual data may not be the best source for predictive evidence for the following reasons:

1. The tests in different grades are administered at different developmental and academic stages of the student's career;

2. The degree and intensity of academic intervention is in direct relationship to performance on the examination. That is, a parity effect exists in which the lowest scoring students are provided with the most intense intervention, which then has the effect of raising scores on the subsequent State tests;

3. The ELA-4 and ELA-8 are both census tests administered to the whole Of those two classes, while the Regents examinations are only administered To students who have completed the coursework and are deemed to be Ready to take the examination.

For these reasons, this study examined two major sources of data independently and then attempted to draw conclusions across the two. The April 2000 CEE results were compared to fourth grade and eighth grade ELA and Math results for the year 2000, under the caveat that these would be district level analyses. District level Regents results

taken from a sample of schools drawn from the cohort surveys were matched with district level results on the fourth and eighth grade examinations, as well.

Hypotheses

Based on the design of the tests, we expect the following in support of the construct validity of ELA-8:

1. The best predictor of the probability of passing the Regents CEE is achieving level 2 or higher on the ELA-8. That is, districts with disappropriate representation of students in level 1 should have the lowest CEE passing rates (higher positive correlations for being in level 2 or higher or negative correlations for being in level 1);

2. The prediction of passing the Regents CEE, based on performance on ELA-8 should be at or above a correlation of .35 (.1225 r-square).

Methods

Overview of Methodology

In view of all these prescriptions, this study used the two data sources cited above. It should be kept in mind that longitudinal student level information may not be the most sensitive predictive source, for reasons given earlier, and that the level of scoring of a district across tests is a valuable indicator of an instructional program that should affect student performance across grades. Therefore, test sensitivity to this cumulative effectiveness of the standards-based academic program should, as well, be a good source of predictive evidence.

Analyses

Zero-order (bivariate) and multivariate correlations were computed among the spring 2000 results from the three instruments (ELA-4, ELA-8, and the CEE) and subsections of the grade four and grade eight examinations using multivariate general linear models and stepwise techniques. The subsections included the open-ended and multiple choice totals taken separately and the Standards Performance Indicators (SPIs), which are scores based performance on the three Learning Standards assessed on the ELA examinations.

The multivariate stepwise regressions utilized a contribution of .05 to the total r-square as a criterion for retaining the independent variables. The dependent variables for these analyses were the district mean score on the April 2000 CEE and the probabilities of achieving a 55, 65, or 85 on the CEE from both data sets, as transformed into the linear delta scale. Dependent variables included the components (SPI's, multiple choice totals and open-ended totals) of ELA-4 and ELA-8 to predict the April 2000 mean score, and

the probabilities of achieving a Level 1, Level 2 and above, Level 3 and above, or Level 4 on ELA-4 and ELA-8 transformed into delta values for both data sets. It was reasoned that the contribution of the ELA-4 achievement levels would be the greater contributors to achieving the lower levels of ELA-8 and that achieving the three levels of the CEE would be the greater contributors to predictions of achieving the higher levels of ELA-8.

The scale scores on the ELA-4 range from 455 to 800, and the scale scores on the ELA-8 range from 517 to 830.

The performance levels for the grade four and grade eight examinations each range from 1, in definite need of academic intervention, to 4, advanced achievement. Levels 1 and 2 are indications of insufficient achievement of the Learning Standards. The three cutoff scores demarcating the four levels of ELA-4 are 601, 645, and 692. The cutoff scores demarcating the four levels of ELA-8 are 662, 701, and 739.

Discriminant analyses were employed to determine if the probabilities of achieving these four levels on ELA-4 and ELA-8, as described above, could be used to classify performance into categories of performance on the CEE based on (proportions below 65 and 65 and above). A priori and posterior probabilities of achieving a 65 or higher were computed for each delta value related to probabilities of achieving Level 2 and above and Level 3 and above on ELA-4 and on ELA-8. If the discriminant analyses classifications were reliable, then the distributions on the ELA-4 and the ELA-8 at which the probabilities for each CEE category were highest could the utility of those scoring levels in terms of future success on the CEE. Again, while these data do not track individual students, they do gain the advantage of freedom from contamination from intervening variables and they directly address the accountability function of the ELA-4 and the ELA-8, as described above.

Samples

April 2000 data. The April 2000 CEE was administered to 6,522 students. They achieved a mean scale score of 55.83 and a standard deviation of 12.99 (see Table 1). The mean of the district means (sampling distribution) was also 55.83, indicating good representation of lower and higher scoring districts by size. The standard deviation of district means was 7.12. The a priori probability of achieving a 65 or higher was 0.24, with a standard deviation of .43. The correlation between district mean scores and the student scores was 0.548.

June 2000 district level data. Three hundred and eight school districts with students who took the June 2000 CEE were sampled for the study. Of these, 306 had complete data on the three tests. The means and standard deviations on the CEE were not available (although, with some distributional assumptions, means and standard deviations could be estimated), but the percentages of children scoring 0-54, 55-64, 65-84, and 85 and above were taken from the statewide survey results. The average percentage at 65 or higher was 79.85, a much higher skilled population, as expected, than the April 2000 group.

These 306 districts were sampled because of their location in counties that represent major demographic attributes of New York State. These counties included New York City (counted as a single county); the counties of each of the Big Four cities (Erie, Monroe, Onondagua, and Westchester); the suburban counties of Rockland, Orange, Nassau, Suffolk, Dutchess, and Putnam; Albany, Rensselaer, and Schenectady because of their diversity in community types and upstate locations; Chautauqua, Chemung, Niagara, and Ulster for their inclusion of both urban and rural communities;

and Broome, Chenango, Fulton, and Genesee for their upstate representation of small communities.

Scales for Analyses

District level percentages or proportions achieving each of the four levels on the grade eight and grade four examinations and on the CEE were all converted to an interval scale (the delta scale described earlier, which is generally used to estimate test item difficulty) in order to perform the mathematical manipulations needed for this study. This scale has a mean of 13 and a standard deviation of –4, so that the smaller percentage achieving any performance level, the higher the delta, which can be interpreted as the higher the difficulty of achieving that level. Means and standard deviations of district level data are presented in Table 2.

Table 1

Means, Standard Deviations, and Correlations

among the 2000 ELA-4, ELA-8,

and the April 2000

Special Administration of the CEE

Test	Variable	Mean	S.D.	Correlations with CEE P(85+)	P(65+)	P(55+)	Probabilities
ELA-4	Scale	655.09	15.27	0.254	0.393	0.441	
	m.c.	20.28	1.46	0.221	0.393	0.451	
	o.e.	8.85	1.03	0.251	0.345	0.379	
	p(level 1)[4]	19.69	2.45	-0.262	-0.431	-0.483	0.047
	p(level 2+)	6.31	2.45	0.262	0.431	0.483	0.953
	p(level 3+)	11.77	1.91	0.251	0.386	0.435	0.619
	p(level 4)	17.41	1.81	0.257	0.345	0.370	0.136
ELA-8	Scale	697.25	11.29	0.337	0.484	0.522	
	m.c.	19.72	1.33	0.297	0.490	0.535	
	o.e.	10.87	1.11	0.334	0.454	0.492	
	p(level 1)	18.25	1.81	-0.320	-0.461	-0.519	0.100
	p(level 2+)	7.75	1.81	0.319	0.460	0.518	0.905
	p(level 3+)	13.62	1.64	0.301	0.475	0.511	0.438
	p(level 4)	18.69	1.55	0.356	0.379	0.380	0.078

Table 2

Means, Standard Deviations, and Correlations

Among Grade ELA-4, ELA-8,

and the CEE, Spring 2000, for 306 School Districts

Test	Variable	Mean	S.D.	Correlations with CEE P(85+)	P(65+)	P(55+)	Probabilities
ELA-4	Scale	665.18	14.94	0.583	0.484	0.312	
	m.c.	21.22	1.28	0.560	0.504	0.312	
	o.e.	9.45	1.02	0.558	0.448	0.284	
	p(level 1)[5]	21.32	2.41	-0.412	-0.309	-0.147	0.015
	p(level 2+)	4.68	2.41	0.412	0.309	0.147	0.981
	p(level 3+)	10.50	2.33	0.567	0.520	0.316	0.735
	p(level 4)	16.46	1.92	0.585	0.501	0.366	0.194
ELA-8	Scale	704.37	16.34	0.502	0.429	0.330	
	m.c.	20.52	1.58	0.506	0.448	0.346	
	o.e.	11.54	1.64	0.528	0.468	0.359	
	p(level 1)	19.63	2.63	-0.381	-0.343	-0.243	0.048
	p(level 2+)	6.37	2.63	0.382	0.344	0.244	0.952
	p(level 3+)	12.60	2.48	0.572	0.514	0.385	0.540
	p(level 4)	18.04	2.06	0.600	0.515	0.395	0.104

Specific Procedures

Two sets of stepwise analyses were used to determine the contribution of multiple grade 8 and grade 4 ELA variables. The two sets of analyses described earlier differed in terms of the choice of dependent variables, one focusing on within-examinee variables, and the other on between examinee variables. Because the within-examinee variables from the ELA-4 and ELA-8 are secondary to the instructional placement of children, and to simplify the considerable volume of results, stepwise analyses of these variables were limited to predicting the scale score mean on the CEE. These variables included: cluster (open-ended) totals (clus4 and clus8, respectively), the multiple choice totals (mc4 and mc8, respectively), and the three standards performance indices from each examination (spi41-spi43 and spi81-spi83, respectively).

The second set of stepwise analyses assessed the contribution of the representation on the ELA-4 and ELA-8 in each of the four scoring levels for each test to the performance of students from those districts on the April CEE. To assess this, the proportions of students scoring in level 1, in levels 2 – 4, in level 3 – 4, and in level 4, just as depicted in Tables 1 and 2 above, were calculated and then transformed to the linear delta scale. The dependent variables for this set of analyses included: Proportion of students in the districts represented on the April CEE achieving 55 or higher, achieving 65 or higher, and achieving 85 or higher; and average scale score of participating districts.

Two discriminant analyses were employed to classify school districts into one of five groups related to proportion of students achieving scores of 65 or higher on the CEE. These groups were: 0 - .20 achieving 65 or higher, .21 - .40 achieving 65 or higher, .41 - .60 achieving 65 or higher, .61 to .80 achieving 65 or higher, and .81 – 1.00 achieving 65

or higher. The prior probabilities were set at the proportional representation of these classifications over all school districts participating in the April administration of CEE. The first analysis found the average district scale scores on the ELA-4 demarcating group membership in each of these five classifications, and the second analysis found that score on the ELA-8.

306 Sampled Districts

The analyses conducted on the sample of 306 school districts were the same as those described above for the April CEE administration, with one exception. Because no scale score average was available for the school districts on the CEE, none of the analyses employed this as a dependent variable. The proportional representation of the school districts at CEE scores of 0 – 54, 55 – 64, 65 – 84, and 85 – 100 remained as dependent variables.

Results

General Findings

Partial correlations and standard errors of prediction for the April 2000 stepwise analyses are given in Table 3. Table 4 shows the results of the discriminant analyses for that sample. Tables 5 and 6, respectively, give the outcomes of these analyses for the 306 districts sampled.

Table 3

Stepwise Regression Results Using

Components of the ELA-4 and ELA-8 and

Proportions Achieving Levels 1 – 4 on the ELA-4

and ELA-8 to Predict Performance on

the April 2000 Administration of The

Regents Comprehensive Examination in English (CEE)

Independent Variable	Dependent Variable	Partial R-Square	Model R-Square	Parameter Estimate	Standard Error
Sp81	Scale mean	0.380	0.380	2.621	0.195
Sp82	Scale mean	0.016	0.396	-1.911	0.208
Clus4	Scale mean	0.001	0.397	1.944	0.198
Sp43	Scale mean	0.009	0.406	-0.281	0.032
MC4	Scale mean	0.008	0.410	1.160	1.169
Sp42	Scale mean	0.005	0.415	-0.231	0.044
Sp41	Scale mean	0.001	0.416	0.078	0.036
Intercept = -1.394					
P(level 3+, 8)[6]	Scale mean	0.346	0.346	-1.667	0.219
P(level 2+, 8)	Scale mean	0.016	0.362	- 2.271	0.681
P(level 4, 4)	Scale mean	0.002	0.364	0.080	0.031
P(level 1, 4)	Scale mean	0.003	0.367	0.103	0.026
P(level 4, 8)	Scale mean	0.002	0.370	0.244	0.151
P(level 1, 8)	Scale mean	0.000	0.370	0.919	0.662
P(level 2+, 4)	Scale mean	0.000	0.370	5.991	7.862
Intercept = -47.300					
P(level 3+, 8)	P(55+)	0.255	0.255	1.253	0.152
P(level 1, 8)	P(55+)	0.012	0.267	-0.579	0.102
P(level 1, 4)	P(55+)	0.004	0.271	-0.078	0.015
P(level 3+, 4)	P(55+)	0.003	0.275	-0.056	0.016
P(level 4, 8)	P(55+)	0.002	0.277	-0.315	0.100
Intercept = 10.676					

Table 3

Stepwise Regression Results Using

Components of the ELA-4 and ELA-8 and

Proportions Achieving Levels 1 – 4 on the ELA-4

and ELA-8 to Predict Performance on

the April 2000 Administration of The

Regents Comprehensive Examination in English (CEE)

Independent Variable	Dependent Variable	Partial R-Square	Model R-Square	Parameter Estimate	Standard Error
P(level 3+, 8)	P(65+)	0.174	0.174	0.978	0.124
P(level 4, 4)	P(65+)	0.002	0.176	-0.043	0.023
P(level 1, 8)	P(65+)	0.003	0.179	0.077	0.450
P(level 1, 4)	P(65+)	0.000	0.179	-5.912	5.793
P(level 3+, 4)	P(65+)	0.001	0.180	-0.047	0.019
P(level 2+, 4)	P(65+)	0.000	0.181	-5.872	5.793
P(level 2+, 8)	P(65+)	0.000	0.181	0.409	0.475
Intercept = 151.707					
P(level 4, 8)	P(85+)	0.113	0.113	0.701	0.074
P(level 3+, 4)	P(85+)	0.010	0.123	-0.043	0.013
P(level 2+, 8)	P(85+)	0.006	0.128	3.237	0.333
P(level 1, 8)	P(85+)	0.018	0.146	2.571	0.324
P(level 3+, 8)	P(85+)	0.014	0.160	-0.779	0.107
P(level 4, 4)	P(85+)	0.000	0.161	-0.021	0.015
P(level 1, 4)	P(85+)	0.000	0.161	-0.009	0.011
Intercept = -49.515					

Table 4

Classificatory Discriminant Analyses

of Proportions within School Districts

Achieving 65 or Better on the Special

April Administration of the CEE,

Based on ELA-4 and ELA-8 Scale Scores

Classification Variable	Prob.	P(scoring 65+):	Posterior Probabilities of Membership 0 - .20	.21-.40	.41-.60	.61-.80	.81-1.00
ELA-4 lev. 2+	0.89	(delta=8.08)	0.271	0.495	0.148	0.008	0.078
	0.97	(delta=5.48)	0.208	0.234	0.286	0.197	0.075
	1.00	(delta=1.00)	0.058	0.243	0.332	0.000	0.367
lev. 3+	0.70	(delta=10.88)	0.209	0.254	0.258	0.196	0.083
ELA-8 lev. 2+	0.95	(delta=6.44)	0.188	0.270	0.291	0.149	0.101
lev. 3+	0.54	(delta=12.60)	0.186	0.282	0.290	0.154	0.089

Table 5

Stepwise Regression Results Using Components of the ELA-4 and ELA-8 and Proportions Achieving Each Level or Higher on the ELA-4 and ELA-8 to Predict Performance on the June 2000 Administration of The Regents Comprehensive Examination in English (CEE) for 306 Districts

Independent Variable	Dependent Variable	Partial R-Square	Model R-Square	Parameter Estimate	Standard Error
P(level 4, 8)	P(55+)	0.188	0.188	1.041	0.349
P(level 4, 4)	P(55+)	0.013	0.201	0.715	0.410
P(level 2+,4)	P(55+)	0.025	0.225	-0.566	0.214
P(level 3+, 8)	P(55+)	0.008	0.233	-0.419	0.337
P(level 3+, 4)	P(55+)	0.005	0.238	0.315	0.301
Intercept = -19.734					
P(level 4, 8)	P(65+)	0.302	0.302	0.873	0.274
P(level 3+, 4)	P(65+)	0.054	0.355	0.872	0.191
P(level 2+, 4)	P(65+)	0.025	0.380	-0.451	0.169
P(level 3+, 8)	P(65+)	0.002	0.382	-0.159	0.233
Intercept = -10.996					
P(level 4, 8)	P(85+)	0.378	0.378	0.729	0.170
P(level 3+, 4)	P(85+)	0.047	0.426	0.178	0.122
P(level 1, 8)	P(85+)	0.021	0.447	0.178	0.086
P(level 4, 4)	P(85+)	0.010	0.456	0.388	0.200
P(level 3+, 8)	P(85+)	0.002	0.459	-0.158	0.184
Intercept = -5.123					

Table 6

Classificatory Discriminant Analyses

of Proportions within School Districts

Achieving 65 or Better on the June

Regents Comprehensive Examination

In English (CEE),

Based on ELA-4 and ELA-8 Scale Scores

For 306 Districts

Classification Variable	Prob. P(scoring 65+):	Posterior Probabilities of Membership 0 - .20	.21-.40	.41-.60	.61-.80	.81-1.00
ELA-4 lev. 2+	0.81 (delta=9.48)	0.186	0.072	0.364	0.257	0.122
	0.89 (delta=8.08)	0.085	0.024	0.319	0.344	0.228
	0.95 (delta=6.44)	0.049	0.009	0.117	0.393	0.432
lev. 3+	0.32 (delta=14.88)	0.367	0.075	0.406	0.115	0.036
	0.48 (delta=13.20)	0.082	0.014	0.349	0.386	0.170
	0.65 (delta=11.44)	0.027	0.004	0.073	0.445	0.451
ELA-8 lev. 2+	0.94 (delta=6.80)	0.029	0.003	0.040	0.454	0.477
lev. 3+	0.19 (delta=16.52)	0.218	0.059	0.390	0.037	0.296
	0.34 (delta=14.64)	0.041	0.009	0.199	0.382	0.369
	0.50 (delta=13.00)	0.019	0.004	0.036	0.459	0.483

Conclusion

Overview of Results

The limitations discussed above on the possible interpretations of the data are central to the considerations of the evidence and also of the utility of predictive sources of evidence in support of a state assessment system in the environment of Learning Standards. This is particularly true of the April 2000 administration of the CEE, which was to a population that had continued to fail the test through multiple attempts. Nevertheless, the strength of relationships attests to the utilityof both the ELA-4 and the ELA-8 as predictors of performance on the Regents examination. Moreover, the very close association of certain ranges of the ELA-4 and ELA-8 scale scores with subsequent passing and failing the Regents is good support for the construct validity of the standard setting process.

Hypotheses

Achieving Level 3 on ELA-8 is consistently the best predictor in the April data for both passing the CEE at the 55 level and for passing the CEE at the 65 level. As the CEE passing criterion is raised to 65 and to 85, being in Level 3 becomes the more powerful predictor. Note that none of the grade four criteria are nearly as powerful as the grade eight performance variables. Regarding the data from the 306 districts, having more students in Level 4 on the grade eight ELA is an obviously strong predictor of performance on the CEE.

The discriminant analyses show that a high proportion of being at or above Level 2 on both the ELA-4 and the ELA-8 was related to having at least .40 to .60 of the

students in the district pass the Regents CEE at the 65 level. Moreover, the analyses show clearly that having at least half of the students achieve Level 3 or higher on both the ELA-4 and the ELA-8 discriminates districts that have at least .40 to .60 pass the CEE Regents at the 65 level.

Predictive Evidence of Validity

The issue of predictive evidence, in its own, needs to be carefully considered. It is not clear that a study relating the scores of the same individuals over years in which there has been systematic exposure to intervening variables is necessarily the best source of this evidence. It may well be that, with some refinement, these district level data, in conjunction with individual data, and perhaps with imbedded items across tests to permit equating, could continue to systematically used to test validity hypotheses. Nevertheless, we must interpret such evidence with caution, never forgetting that the function of these state assessments is to certify the achievement of the Learning Standards.

Evaluating the sources of predictive evidence becomes an important process when the purposes of the tests are so specific. Showing that the percentage of children at or above Level 3 on the ELA-8, for example, while on the surface seems like a good criterion for predictive evidence, may not be as strong as it seems. For example, in defining the four levels of performance on the grade eight and grade four examinations, the standard setting studies referred to the extent of acquisition of the appropriate Learning Standards for the grade. Reference was not made to whether Level 1 or Level 2 should correspond to a particular level of passing the Regents. Rather, each successive level of achievement should be monotonically related to the probability of ultimately passing the Regents on the basis of achieving the Learning Standards.

Therefore, for the purposes of predictive evidence, Level 1, according to definition, indicates that the appropriate standards have not been achieved, and therefore identification in at least level 1 should be a powerful predictor of passing the CEE at 55, 65, or 85. Level 2, which indicates at least partial deficiency should also be related to lower passing rates on the Regents at any score, while higher probabilities of achieving Levels 3 and 4 should evidence positive relationships. For the purposes of academic intervention, then, identification in Level 2 should trigger intervention, because the Standards have not been fully achieved.

Simply put, there is no reason to expect that proportions of children performing at one level of a lower grade test should match proportions performing at a level on a subsequent State examination. Rather, we would expect that the probability of passing the Regents at any cut score increases as the probability of performance at each level of the grade eight test increases. That is why the multivariable correlative analyses are such a central source of predictive evidence.

The weight of the evidence is overwhelming that this relationship is precisely what is observed. To examine its nature, one final analysis was undertaken. Using data from the 306 districts, it was hypothesized that as the scale scores on the ELA-8 increased, that the differences between the probability of scoring at or above that scale score and the probabilities of achieving certain CEE scores (55, 65, and 85) would first decrease and then increase. That is, as the ELA-8 criteria for passing increase, the probabilities associated with those scores would decrease until they virtually matched the probabilities of passing the CEE. Then, as the criterion scores continue to increase, the passing rates on the ELA-8 would drop and the probabilities for passing the CEE would be higher. More importantly, however, is that the higher the CEE score used as a

criterion (55, 65, or 85), the higher the ELA-8 score with the most similar proportion achieving that score (the lower the difference between the proportions achieving scores on each test).

Table 7 presents the differences in delta units between the proportion at or above each ELA-8 score and proportions achieving 55, 65, and 85 on the CEE. These proportion differences are squared, averaged within districts and the square root is taken of that average to approximate errors of prediction of one test onto the other based on rates achieving each score (note, the Appendix provides the same statistic for the reader's information but taken as proportions rather than transformed into the delta metric). It is clear that the pattern of these decreases in the errors supports the hypotheses. It is also clear, from the bold entries (the lowest error), that the agreement in proportions achieving 65 on the CEE and the ELA-8 are best at the ELA-8 scale score of 677, somewhat about the Level 2 cut score of 662. Thereafter, the agreement with achieving a 65 on the CEE remains better than of achieving a 55 on the CEE for each score of the ELA-8. Similarly, the proportions scoring at or above 85 on the CEE are most similar to the proportions scoring at or above 731on the ELA-8. Again, the magnitudes of these agreements are not in themselves the test of predictive evidence. However, the monotonicity of the relationships clearly lends support to the predictive evidence. In a sense, these analyses address the issues of what would the cut scores have to be to maximize the agreement in proportions achieving that score and proportions passing the Regents examination. The answer, taking into account the statistical error inherent in these sampling procedures, is clearly right around where the cut scores are now! Figure 1 illustrates the relationship between achieving each scale score on ELA-8 and achieving a 55, 65, or 85 on the CEE.

Table 8 presents a representation of the relationship between an independent variable of each ELA-8 scale score and the dependent variable of the differences in delta units between the proportions at or above 55, 65, and 85 on the Regents CEE and at or above each of those scale scores. The relationship is remarkably quadratic, as predicted: as the criterion ELA-8 score increases, the differences in proportions passing ELA-8 and passing the Regents CEE decreases and then increases, as you would expect with a monotonic relationship between the passing rates on the two examinations. The quadratic relationship of achieving a 65 on the CEE is; .00167 (criterion ELA-8 score squared) - 2.2489 (criterion ELA-8 score) +.759.2543. When we differentiate and solve for the minima, we attain a score of 673.32, between the Level 2 and Level 3 cutoffs.

Table 7

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Delta Units)

ELA-8 Scale Score	Agreement Error of Probability of Achieving CEE Scores at or above 55	65	85
610	17.64	15.08	8.20
611	3.68	6.24	13.12
612	3.68	6.24	13.12
613	3.68	6.24	13.12
614	3.68	6.24	13.12
615	3.68	6.24	13.12
616	3.68	6.24	13.12
617	3.68	6.24	13.12
618	2.56	5.12	12.00
619	2.56	5.12	12.00
625	2.56	5.12	12.00
626	2.56	5.12	12.00
627	2.56	5.12	12.00
628	2.56	5.12	12.00
629	2.56	5.12	12.00
630	2.56	5.12	12.00
631	2.56	5.12	12.00
632	1.88	4.44	11.32
633	1.88	4.44	11.32
634	1.88	4.44	11.32
635	1.88	4.44	11.32
636	1.88	4.44	11.32
637	1.88	4.44	11.32
638	1.88	4.44	11.32
639	6.36	8.92	15.80

Table 7

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Delta Units)

ELA-8 Scale Score	Agreement Error of Probability of Achieving CEE Scores at or above 55	65	85
640	1.36	3.92	10.80
641	1.36	3.92	10.80
642	1.36	3.92	10.80
643	1.36	3.92	10.80
644	0.92	3.48	10.36
645	0.92	3.48	10.36
646	0.92	3.48	10.36
647	0.92	3.48	10.36
648	0.56	3.12	10.00
649	0.56	3.12	10.00
650	0.56	3.12	10.00
651	0.56	3.12	10.00
652	0.24	2.80	9.68
653	0.24	2.80	9.68
654	0.24	2.80	9.68
655	0.00[7]	2.56	9.44
656	0.00	2.56	9.44
657	0.28	2.28	9.16
658	0.28	2.28	9.16
659	0.52	2.04	8.92
660	0.52	2.04	8.92
661	0.72	1.84	8.72
662	0.72	1.84	8.72

Table 7

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Delta Units)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
663	0.96	1.60	8.48
664	0.96	1.60	8.48
665	1.12	1.44	8.32
666	1.12	1.44	8.32
667	1.32	1.24	8.12
668	1.48	1.08	7.96
669	1.48	1.08	7.96
670	1.68	0.88	7.76
671	1.84	0.72	7.60
672	1.96	0.60	7.48
673	1.96	0.60	7.48
674	2.12	0.44	7.32
675	2.28	0.28	7.16
676	2.40	0.16	7.04
677	2.56	**0.00**	6.88
678	2.56	0.00	6.88
679	2.68	0.12	676
680	2.80	0.24	6.64
681[8]	*2.96*	*0.40*	*6.48*
682	3.08	0.52	6.38
683	3.20	0.64	6.24
684	3.32	0.76	6.12
685	3.44	0.88	6.00
686	3.64	1.08	5.80
687	3.76	1.20	5.68

Table 7

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Delta Units)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
688	3.88	1.32	5.56
689	4.00	1.44	5.44
690	4.08	1.52	5.36
691	4.20	1.64	5.24
692	4.40	1.84	5.04
693	4.52	1.96	4.92
694	4.64	2.08	4.80
695	4.72	2.16	4.72
696	4.92	2.36	4.52
697	5.04	2.48	4.40
698	5.12	2.56	4.32
699	5.32	2.76	4.12
700	5.44	2.88	4.00
701	5.48	2.92	3.96
702	5.80	3.24	3.64
703	5.84	3.28	3.60
704	5.96	3.40	3.48
705	6.04	3.48	3.40
706	6.24	3.68	3.20
707	6.36	3.80	3.08
708	6.44	3.88	3.00
709	6.64	4.08	2.80

Table 7

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Delta Units)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
710	6.76	4.20	2.68
711	*6.88*	*4.32*	*2.56*
712	6.96	4.40	2.48
713	7.20	4.64	2.24
714	7.28	4.72	2.16
715	7.40	4.84	2.04
716	7.52	4.96	1.92
717	7.64	5.08	1.80
718	7.84	5.28	1.60
719	7.96	5.40	1.48
720	8.08	5.52	1.36
721	8.20	5.64	1.24
722	8.32	5.76	1.12
723	8.48	5.92	0.96
724	8.60	6.04	0.84
725	8.72	6.16	0.72
726	8.72	6.16	0.72
727	8.88	6.32	0.56
728	9.00	6.44	0.44
729	9.16	6.60	0.28
730	9.32	6.76	0.12
731	9.44	6.88	**0.00**
732	9.60	7.04	0.16
733	9.60	7.04	0.16
734	9.80	7.24	0.36

Table 7

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Delta Units)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
735	9.96	7.40	0.52
736	10.16	7.60	0.72
737	10.16	7.60	0.72
738	10.32	7.76	0.88
739	10.32	7.76	0.88
740	10.56	8.00	1.12

Table 8

Multivariate Regression of Agreement Error in Delta Units between Proportions Achieving at or above Each Scale Score on the ELA-8 and Proportions Achieving 55, 65, and 85 on the Regents CEE onto the ELA-8 Scale Scores

CEE Passing Score	Independent Variable	Partial R-Square	Model R-Square	Parameter Estimate	Standard Error
55	ELA-8 Score	0.052	0.052	-0.875	0.103
	ELA-8 Score squared	0.855	0.907	0.000	0.000
Intercept = 269.778					
65	ELA-8 Score	0.498	0.498	-1.947	0.112
	ELA-8 Score squared	0.292	0.790	0.001	0.000
Intercept = 646.743					
85	ELA-8 Score	0.946	0.946	-0.457	0.074
	ELA-8 Score squared	0.009	0.955	0.000	0.000
Intercept = 191.594					

Figure 1

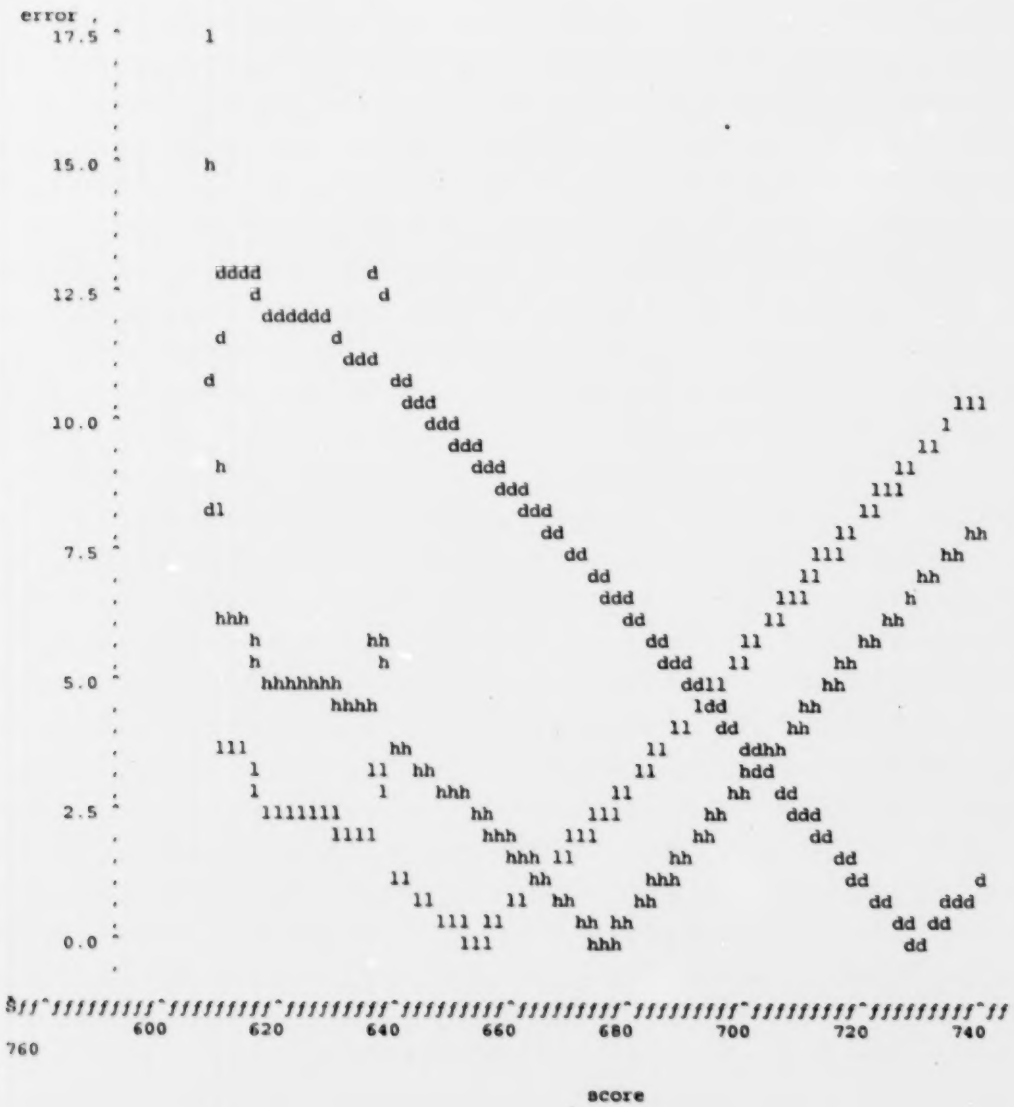
Plot of Agreement Error

of Proportions Achieving

at or Above ELA-8 Scale Scores and

Regents CEE Scale Scores of 55 ("l"),

65 ("h"), and 85 ("d"), 306 Districts



Appendix

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Proportions, Absolute Differences)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
610	0.92	0.78	0.17
611	0.07	0.21	0.82
612	0.07	0.21	0.82
613	0.07	0.21	0.82
614	0.07	0.21	0.82
615	0.07	0.21	0.82
616	0.07	0.21	0.82
617	0.07	0.21	0.82
618	0.06	0.20	0.81
619	0.06	0.20	0.81
620	0.06	0.20	0.81
621	0.06	0.20	0.81
622	0.06	0.20	0.81
623	0.06	0.20	0.81
624	0.06	0.20	0.81
625	0.06	0.20	0.81
626	0.06	0.20	0.81
627	0.06	0.20	0.81
628	0.06	0.20	0.81
629	0.06	0.20	0.81
630	0.06	0.20	0.81
631	0.06	0.20	0.81
632	0.05	0.19	0.80
633	0.05	0.19	0.80
634	0.05	0.19	0.80

Appendix

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Proportions, Absolute Differences)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
635	0.05	0.19	0.80
636	0.05	0.19	0.80
637	0.05	0.19	0.80
638	0.05	0.19	0.80
639	0.08	0.22	0.83
640	0.04	0.18	0.79
641	0.04	0.18	0.79
642	0.04	0.18	0.79
643	0.04	0.18	0.79
644	0.03	0.17	0.78
645	0.03	0.17	0.78
646	0.03	0.17	0.78
647	0.03	0.17	0.78
648	0.02	0.16	0.77
649	0.02	0.16	0.77
650	0.02	0.16	0.77
651	0.02	0.16	0.77
652	0.01	0.15	0.76
653	0.01	0.15	0.76
654	0.01	0.15	0.76
655	0.00	0.14	0.75
656	0.00	0.14	0.75
657	0.01	0.13	0.74
658	0.01	0.13	0.74
659	0.02	0.12	0.73

Appendix

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Proportions, Absolute Differences)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
660	0.02	0.12	0.73
661	0.03	0.11	0.72
662	0.03	0.11	0.72
663	0.04	0.10	0.71
664	0.04	0.10	0.71
665	0.05	0.09	0.70
666	0.05	0.09	0.70
667	0.06	0.08	0.69
668	0.07	0.07	0.68
669	0.07	0.07	0.68
670	0.08	0.06	0.67
671	0.09	0.05	0.66
672	0.10	0.04	0.65
673	0.10	0.04	0.65
674	0.11	0.03	0.64
675	0.12	0.02	0.63
676	0.13	0.01	0.62
677	0.14	**0.00**	0.61
678	0.14	0.00	0.61
679	0.15	0.01	0.60
680	0.16	0.02	0.59
681	*0.17*	*0.03*	*0.58*
682	0.18	0.04	0.57
683	0.19	0.05	0.56
684	0.20	0.06	0.55

Appendix

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Proportions, Absolute Differences)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
685	0.21	0.07	0.58
686	0.23	0.09	0.57
687	0.24	0.10	0.56
688	0.25	0.11	0.55
689	0.26	0.12	0.53
690	0.27	0.13	0.48
691	0.28	0.14	0.47
692	0.30	0.16	0.45
693	0.31	0.17	0.44
694	0.32	0.18	0.43
695	0.33	0.19	0.42
696	0.35	0.21	0.40
697	0.36	0.22	0.39
698	0.37	0.23	0.38
699	0.39	0.25	0.36
700	0.40	0.26	0.42
701	0.41	0.27	0.40
702	0.43	0.29	0.39
703	0.44	0.30	0.38
704	0.45	0.30	0.36
705	0.46	0.32	0.29
706	0.48	0.34	0.27
707	0.49	0.35	0.26
708	0.50	0.36	0.25
709	0.52	0.38	0.23

Appendix

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Proportions, Absolute Differences)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
710	0.53	0.39	0.22
711	0.54	0.40	0.21
712	0.55	0.41	0.20
713	0.57	0.43	0.18
714	0.58	0.44	0.17
715	0.59	0.45	0.16
716	*0.60*	*0.46*	*0.15*
717	0.61	0.47	0.14
718	0.63	0.49	0.12
719	0.64	0.50	0.11
720	0.65	0.51	0.10
721	0.66	0.52	0.09
722	0.67	0.53	0.08
723	0.68	0.54	0.07
724	0.69	0.55	0.06
725	0.70	0.56	0.05
726	0.70	0.56	0.05
727	0.71	0.57	0.04
728	0.72	0.58	0.03
729	0.73	0.59	0.02

Appendix

Agreement Error Conditioned on ELA-8 Scale Score,

Probability of Students at Each Scale Score

Passing the CEE at 55, 65, and 85,

Based on 306 Districts (Proportions, Absolute Differences)

ELA-8 Scale Score	Agreement Error for Probability of Achieving CEE Scores at or above 55	65	85
730	0.74	0.60	0.01
731	0.75	0.61	**0.00**
732	0.76	0.62	0.01
733	0.76	0.62	0.01
734	0.77	0.63	0.02
735	0.70	0.64	0.03
736	0.70	0.65	0.04
737	0.71	0.65	0.04
738	0.82	0.66	0.05
739	0.83	0.66	0.05
740	0.81	0.67	0.06

[1] American Educational research Association, American Psychological Association, and National Council on Measurement in Education *Standards for Educational and Psychological Testing (*Author, Washington, DC: 1999), see especially p. 17.

[2] *Ibid.*, p. 13.

[3] *Ibid.*, p. 14.

[4] Means, standard deviations, and correlations are in delta units. Because delta units are a difficulty scale, the correlations have been transformed from negative values to positive values.

[5]Means, standard deviations, and correlations are in delta units. Because delta units are a difficulty scale, the correlations have been transformed from negative values to positive values.

[6] Should be read as the probability of achieving level 1 on the grade 8 ELA.

[8] Note italicized ELA-8 scores indicate the first score of a level of performance, e.g., the lowest level 2 score.

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